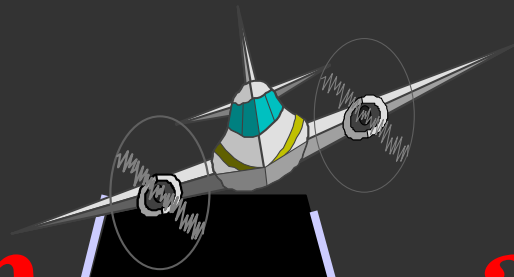


**What's In**

**a Name?**



**A Dilemma**

**About Runway Safety**

**Arnold Barnett,  
MIT**

# Question:

**How might expected growth in US airport traffic affect the risk of fatal runway collisions?**

# **Approximate Answer:**

**Overall, US runway collisions over the next two decades could cause 700-800 deaths and 200 serious injuries.**

**(Mid-range figure)**

**Given this projection:**

**Acting to reduce the risk of runway collisions is of real importance. But what should we do? How much should we pay?**

# **Two Ways To Reduce Runway Collision Risk:**

- **Greater Use of Secondary  
Airports**

**(Under N<sup>2</sup>-model, such displacement of  
traffic systematically improves safety.)**

- **New technology (and training)**

# Question:

**How effective would  
particular technologies be  
in reducing the risk of  
runway collisions?**

## Specific Issue:

**What is the **marginal** benefit when aircraft name tags with color displays **are added to** ground radar with collision alerts?**

# General Approach:

**Arrange for a panel of controllers/pilots, advised by experts about the technologies, to evaluate a large set of recent US runway collisions and harrowing close calls.**



## **Initial Inquiry:**

**\_\_\_\_ Would ground radar plus collision- alert capability have prevented the event just described from becoming a collision?**

# **Possible Answers:**

- (i) Almost definitely**
- (ii) Probably**
- (iii) 50/50**
- (iv) Probably Not**
- (v) Almost Definitely Not**

**After some group discussion,  
each panelist provided his/her  
own assessment in a “secret  
ballot.”**

**Interpretations:**

<b>Almost Definitely:</b>	<b>100%</b>
<b>Probably:</b>	<b>75%</b>
<b>50/50:</b>	<b>50%</b>
<b>Probably Not:</b>	<b>25%</b>
<b>Almost Definitely Not:</b>	<b>0%</b>

# **Then came a follow-up question:**

If you answered the previous question with anything but “Almost Definitely,” you see **at least some chance** that ground radar/collision alert would not in itself have prevented the accident.

If ground radar/collision alert **were not successful**, would the additional capability provided by aircraft name tags and color displays have prevented the accident?

**Suppose:**

**P = Prob(Radar/Alert would prevent collision)**

**Q = Prob(Name Tags would prevent collision  
given that Radar/Alert did not)**

**Then, marginal effectiveness of Name Tags is:**

$$(1-P)*Q$$

**Example:  $P = 75\%$ ,  $Q = 75\%$**

**75%** chance that radar/alert would prevent the collision

**19%** chance ( $.25 * .75$ ) that radar/alert would fail but name tags would **save the day**

**6%** chance that the collision would occur

# **Advantages of Approach:**

- **Actual recent events, considered individually**
- **Controllers/pilots rule, assisted by technology experts**
- **One expert, one vote**
- **Participants encouraged to express uncertainty rather than suppress it**

## Final Approximation:

In themselves, name tags would add about **ten percentage points** to the probability of preventing a runway emergency from resulting in a collision. (60%  $\longrightarrow$  70%)